

REMARKS

By the present amendment, independent claim 1 has been amended to further clarify the concepts of the present invention. It is submitted that these amendments to claim 1 are helpful in distinguishing the subject claims over the cited art and do not raise new issues which would require further consideration and/or search. In addition, it is submitted that such amendments place the application in better form for appeal by materially reducing or simplifying the issues for appeal. Furthermore, no additional claims are presented without cancelling a corresponding number of finally rejected claims. In view of the above, it is submitted that entry of the above amendments is in order and such is respectfully requested.

In the Office Action, claims 1-4 again were rejected under 35 USC § 103(a) as being unpatentable over Japanese patent publication 08-216278 in view of Japanese patent publication 9-239807. In making this rejection, it was asserted that the former publication (the '278 publication) teaches the entire method for manufacturing a hose as claimed with the exception of extrusion molding the inner layer without a mandrel. The latter publication (the '807 publication) was then asserted to supply this deficiency. Reconsideration of this rejection in view of the above claim amendments and the following comments is respectfully requested.

Before discussing the rejection in detail, a brief review of the presently claimed invention may be quite instructive. The subject invention as defined by amended claim 1 herein relates to a method for manufacturing a fuel transporting hose having an intermediate rubber layer and a rubber outer layer sequentially laminated on an outer peripheral surface of a fluoro rubber inner layer. This method comprises the steps of: only co-extruding fluoro rubber and an intermediate layer rubber material without using a mandrel to form the intermediate rubber layer on an outer peripheral surface of the fluoro rubber inner layer; extruding an outer layer rubber material on an outer peripheral surface of the intermediate rubber layer to form the rubber outer layer and thereby form an unvulcanized hose having the fluoro rubber inner layer, the intermediate rubber layer and the rubber outer layer; after the above steps, vulcanizing the unvulcanized hose to form a fuel transporting hose; and forming a fluorine-modified silicone lubricating layer on an inner peripheral surface of the fluoro rubber inner layer.

An important feature of the presently claimed invention is that the fluoro rubber and an intermediate layer rubber material are only co-extruded without using a mandrel to form the intermediate rubber layer on an outer peripheral surface of the fluoro rubber inner layer. More specifically, the present invention manufactures a fuel transporting hose without the use of a mandrel so that it becomes unnecessary to pull out the mandrel by water pressure. It also becomes unnecessary to consider pressure resistance in pulling out the mandrel by water pressure. Therefore, the method of the present invention can

significantly reduce manufacturing costs, equipment costs and material costs, in comparison with conventional methods which do use a mandrel. It is submitted that the subject method, and the specific features and advantages thereof, are not taught or suggested by the cited Japanese patent publications, whether taken singly or in combination.

More particularly, the cited '278 Japanese publication discloses "a method of manufacturing a hose comprising the steps of: extrusion molding an unvulcanized fluoro rubber on the surface of a mandrel; vulcanizing the unvulcanized fluoro rubber to form a hose having a fluoro rubber inner layer; and coating a fluoro-modified silicone lubricant solution on an inner peripheral surface of the fluoro rubber inner layer to form a lubricating layer." However, the method of the present invention include the important feature that fluoro rubber and an intermediate layer rubber material are co-extruded without using a mandrel. As mentioned above, the subject method which does not use a mandrel has the important effects in that manufacturing costs, equipment costs and material costs can be significantly reduced, in comparison with conventional methods that use a mandrel. There is no teaching or suggestion in the '278 Japanese publication regarding such characteristic features of the subject invention and resultant important effects. It is submitted that these teaching deficiencies are not supplied by the '807 Japanese patent publication.

More particularly, the cited '807 Japanese publication discloses a method for

producing a multilayered hose including a resin layer and a rubber layer being in a mutually close contact state by using an extrusion molding machine. According to the publication, the method comprises extrusion-molding the multilayered hose by degassing the gap between the resin layer and the rubber layer to extrude both layers from the die head of the extrusion molding machine in a mutually close contact state.

Thus, in the method disclosed in the '807 publication, it is intended to adhere dissimilar materials such as resin and rubber. Since resin is hard and rubber is soft, an air layer is present between the resin layer and the rubber layer when extruding both layers from the die head of the extrusion molding machine. Therefore, it is necessary to degas the gap between the resin layer and the rubber layer.

While, the '807 Japanese publication does describe a method for adhering the resin layer to the rubber layer without using a mandrel, it is necessary according to the disclosed method, to degas the gap between the resin layer and the rubber layer. Such a degassing process requires special equipment, for example, a vacuum device 10 and the like as shown in Fig. 1 of the publication, as well as an additional and special step of adjusting the degree of vacuum by degassing and the like. In addition, in the method disclosed in the '807 publication, it is necessary to blow compressed air onto an inner surface of the resin layer to press the inner surface of the resin layer against the rubber layer.

In distinct contrast, the method of manufacturing a fuel transporting hose according to the presently claimed invention has both an inner layer and an outer layer formed from rubber materials which are similar materials. Thus, by only co-extruding a fluoro rubber and an intermediate layer rubber material without using a mandrel an unvulcanized intermediate rubber layer can be formed on an outer peripheral surface of an unvulcanized fluoro rubber inner layer. Then, by vulcanizing the unvulcanized rubber, the fluoro rubber inner layer can be more firmly attached to the intermediate rubber layer. Specifically, in the method according to the present invention, since no air layer is present between the fluoro rubber inner layer and the intermediate rubber layer, a degassing process is not necessary. Further, it is not necessary to blow compressed air onto an inner surface of the fluoro rubber inner layer to press the inner surface of the resin layer against the intermediate rubber layer.

As described above, a method for manufacturing a fuel transporting hose according to the present invention differs from a method for adhering a resin layer to a rubber layer according to the '807 Japanese publication in that, among other things, similar rubber materials are co-extruded without using a mandrel. There is no teaching or suggestion in the cited publication regarding adhesion between similar rubber layers.

In this regard, it is to be noted that, when adhering one rubber layer to another rubber layer, according to the method of the '807 publication, the following problems may

occur. Namely, since the co-extruded rubber inner layer and rubber outer layer are soft in an unvulcanized state, the rubber inner layer and the rubber outer layer may be deformed by degassing the gap between both layers by a vacuum device and the like, or blowing compressed air onto an inner surface of the rubber inner layer. Thus, the resultant hose according to the cited publication would have remarkably inferior dimensional accuracy, and thus has inferior sealability and pull-out resistance. Therefore, the hose according to the cited publication cannot be used as a fuel transporting hose as a hose according to the present invention.

In addition, it may be that since the resin layer used as an inner layer according to the '807 publication is relatively hard, the resin layer functions as a mandrel, thus helping to prevent deformation of the resin layer. Therefore, there is no teaching or suggestion in the cited publication concerning co-extrusion molding of rubber layers.

It is further submitted in support of the patentability of the subject invention over the teachings of the cited publications is that these publications provide no suggestion to motivate one of ordinary skill in the art to combine their teachings in the manner proposed in the Action. It is well established principle of U.S. patent practice that the prior art must contain some suggestion for combination since, without such, any combination is pure speculation on the part of the examiner and is based on a prohibited hindsight reconstruction from applicants' own disclosure.

For the reasons stated above, withdrawal of the rejection under 35 U.S.C. § 103(a) and allowance of claims 1 through 4 as amended over the cited publications are respectfully requested.

In view of the foregoing, it is submitted that the subject application is now in condition for allowance and early notice to that effect is earnestly solicited.

In the event this paper is not timely filed, the undersigned hereby petitions for an appropriate extension of time. The fee for this extension may be charged to Deposit Account No. 01-2340, along with any other additional fees which may be required with respect to this paper.

Respectfully submitted,

ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP



Donald W. Hanson
Attorney for Applicants
Reg. No. 27,133

Atty. Docket No. 010760
Suite 1000, 1725 K Street, N.W.
Washington, D.C. 20006
(202) 659-2930
DWH/rab



23850

PATENT TRADEMARK OFFICE